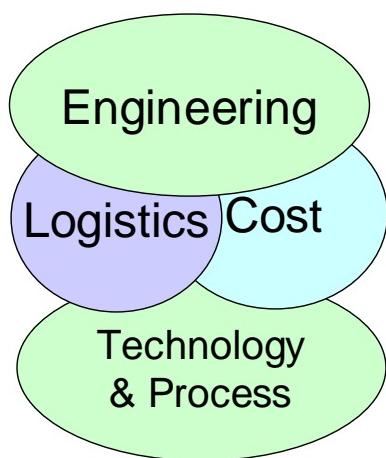




Process for Evaluating Logistics Readiness Levels (LRLs)

May 10, 2006



Aging Aircraft Integrated Product Team (AAIPT)
Presented by Elizabeth Broadus
Booz Allen Hamilton, Inc.

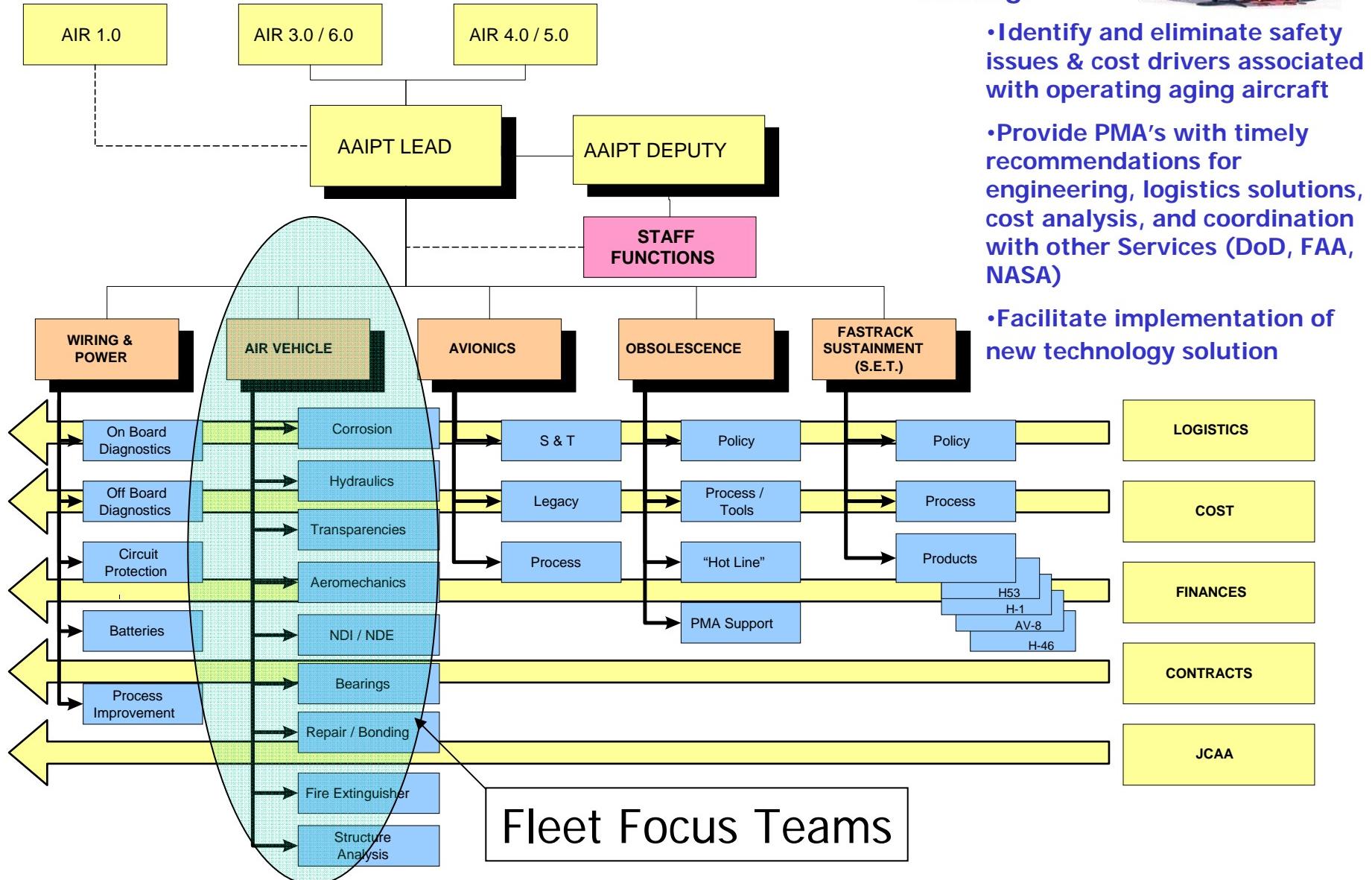
Report Documentation Page			<i>Form Approved OMB No. 0704-0188</i>		
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE 10 MAY 2006	2. REPORT TYPE	3. DATES COVERED 00-00-2006 to 00-00-2006			
4. TITLE AND SUBTITLE Process for Evaluating Logistics Readiness Levels (LRLs)		5a. CONTRACT NUMBER			
		5b. GRANT NUMBER			
		5c. PROGRAM ELEMENT NUMBER			
6. AUTHOR(S)		5d. PROJECT NUMBER			
		5e. TASK NUMBER			
		5f. WORK UNIT NUMBER			
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Booz Allen Hamilton Inc,134 National Business Pkwy,Annapolis Junction,MD,20701		8. PERFORMING ORGANIZATION REPORT NUMBER			
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)		10. SPONSOR/MONITOR'S ACRONYM(S)			
		11. SPONSOR/MONITOR'S REPORT NUMBER(S)			
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES See also ADM002184. Presented at the Air Force Research Laboratory Seminar/Workshop on Multi-Dimensional Assessment of Technology Maturity in Fairborn, OH on 9-11 May 2006.					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 21	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

Agenda



- Aging Aircraft Integrated Product Team (AAIPT) Organization
- Background of Logistics Readiness Level (LRL) concept
- LRL Defined
- LRL Evaluation Criteria
- LRL Quantified
- LRL Tool
- LRL Prototypes
- Benefits
- Next Steps
- Questions
- NAVAIR Aging Aircraft Points of Contact

AAIPT Organization



Background



- LRL concept evolved from the DOD 5000.2 mandated Technology Readiness Levels (TRL) assessment process
 - TRLs provide:
 - Evaluation of critical technology **maturity**
 - Maturation plan (as needed)
 - Best practices/guidelines for each Milestone
 - MS B target is TRL = 6
 - MS C target is TRL = 7
 - MS C preferred is TRL = 8
 - Understanding of the technical maturity without consideration of the sustainment of those technologies
 - TRLs were never intended to consider logistics

LRL is a new concept intended to consider sustainment issues

Background



- Logistics benchmark system was desirable
 - ~10 logistics elements that are often interdependent and parallel are required to successfully acquire, field, and support new technology
 - Aid in understanding what sustainment is required at different time phases

**Engineers and Logisticians need clear definition
of what is required for sustainment at each
phase of a project**

LRL Definition



- LRL intent:
 - Provide a methodology for assessing Logistic Element Readiness for technology
 - Establish benchmarks for programs at different phases in time
 - Provide a management tool to forecast logistics workload, manpower requirements, identify gaps, etc.
- NAVAIR Aging Aircraft convened a working group of engineers, logisticians, and program managers to draft an LRL concept
 - **LRL concept is work in progress**
 - Initial phase focus was on technology insertion for in-service (post MS C) aircraft platforms

LRL Definition



- LRL's evaluated for 6 project phases:
 - Lab Test/R&D
 - Project Definition (Fleet Need/metrics/BCA/Decision to proceed)
 - Project Development /Implementation (Finalized analysis, change recommended, ECP development, Class II change development, RAMEC, LECP, other)
 - Engineering Validation
 - Fleet Verification
 - Fleet Use
- First step is to discern what phase your tech insertion project is in

LRL Definition



- Evaluation Criteria gathered from numerous sources including but not limited to:
 - Defense Acquisition Guidebook
 - OSD Designing and Assessing Supportability in DOD Weapon Systems: A Guide to Increased Reliability and Reduced Logistics Footprint
 - DON Independent Logistics Assessment Handbook
 - Defense Acquisition University logistics curriculum
 - NAVAIR Acquisition Logistics Support Plan Guide
 - NAVAIR Deputy Assistant Program Manager for Logistics (DAPML) Handbook
 - ASN RD&A Acquisition Logistics for the Rest of Us

LRL Definition



- Evaluation criteria established for each phase in a Microsoft Excel worksheet format
 - Determined what is the benchmark of required tasks appropriate for each logistics element at that time phase
 - Not all elements require same level or effort in the same time phase
- Answers question of “What tasks must be complete at each project phase for each logistics element?”

LRL Evaluation Criteria – Excerpt for Design Interface

Phase	Lab Test/ R&D phase	Project Definition	Project Development/ Implementation	Engineering Validation	Fleet Verification	Fleet Use
Design Interface	Review and identify significant design interface impacts of project to existing system or platform (eg. available power, weight constraints, etc.) Create POAM to resolve any design interface issues.	Existing Reliability and Maintainability (RAM) metrics reviewed. Initial improvement predictions determined. Design interface issue resolution in work.	For new designs, Reliability Centered Maintenance (RCM) and Failure Modes and Effects Analysis (FMEA) completed to identify failure modes, failure frequency, effect on performance, and criticality. For modifications to existing design, RCM and FMECA reviewed for impacts. Design interface issues resolved.	Results of RCM and FMEA used to develop or modify existing condition based and schedule based maintenance tasks. Results of RCM and FMEA also used to update the Critical Items list as applicable. Technical data updates drafted and validated.	Technical updates (such as Maintenance Requirement Card changes) verified.	Technical updates completed and available.

LRL Evaluation Criteria – Excerpt for Training & Facilities

Phase	Lab Test/ R&D phase	Project Definition	Project Development/ Implementation	Engineering Validation	Fleet Verification	Fleet Use
Training		Existing training procedures/ curricula and training plan identified and reviewed.	Impacts to Training identified	Training curricula changes drafted. As required changes to Naval Training Systems Plan (NTSP) drafted.	Training curricula changes updated post validation/verification with changes as necessary. NTSP changes finalized. Changes submitted for approval.	Training curricula updated. NTSP updated.
Facilities			Current Facilities reviewed and impacts identified. When applicable, facilities modifications or new requirements are documented and analysis completed for (in) adequacy of existing facilities, trade studies for optimal new facility, funding requested.	As needed with funding available, Facilities modifications or new facilities projects in work.	Facilities project completed and approved.	New or modified Facilities completed .

LRL Evaluation Criteria – Excerpt for DMSMS

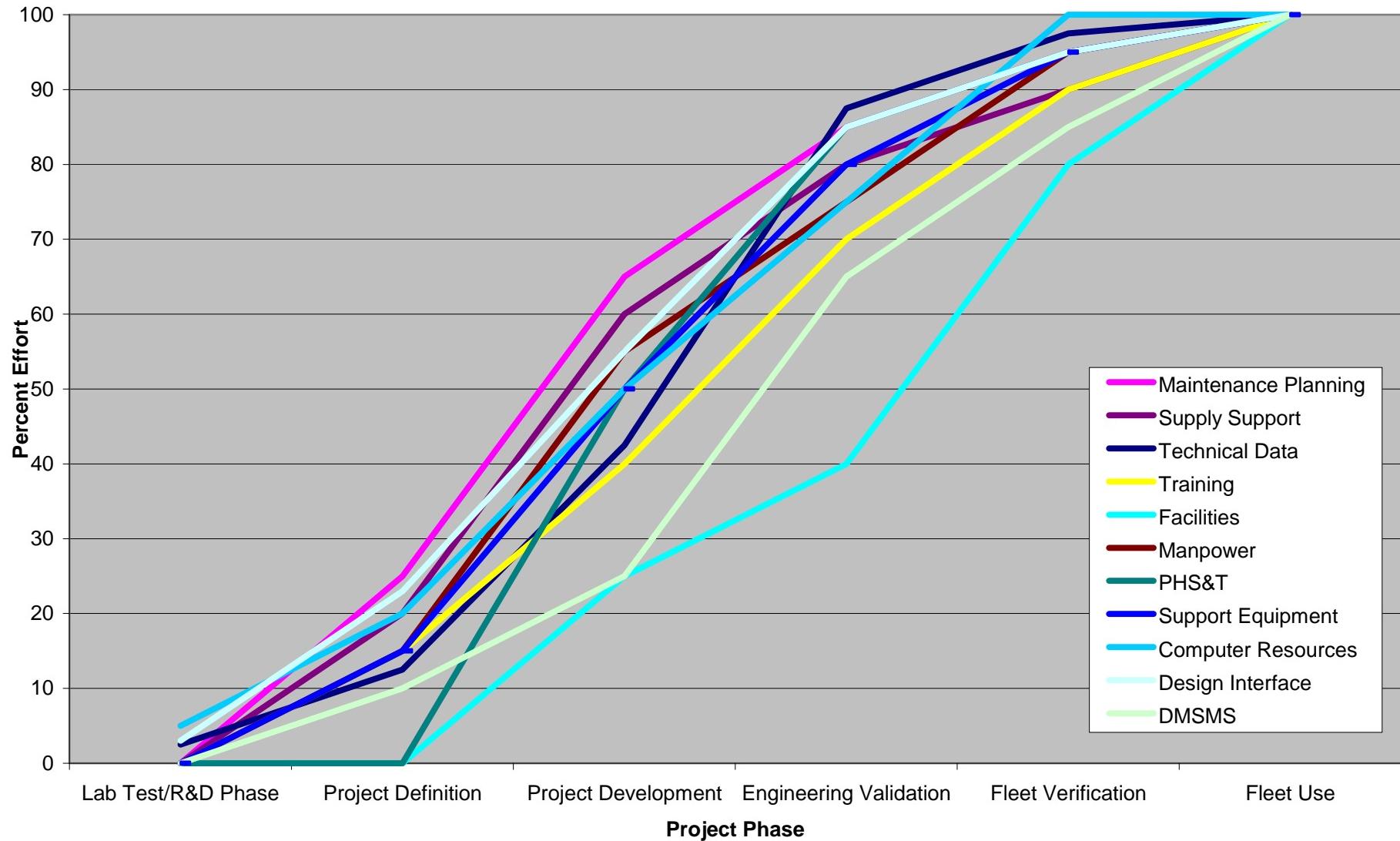
Phase	Lab Test/R&D phase	Project Definition	Project Development/Implementation	Engineering Validation	Fleet Verification	Fleet Use
DMSMS		Existing DMSMS program management plan reviewed. Determine the technical refresh strategy (2 yr, 4 yr, spiral, etc.)	New technology evaluated to determine criticality as it relates to DMSMS. Assess components against the tech refresh strategy. Impacts to DMSMS plan or metrics identified.	DMSMS forecasting completed for new technology. Updates to DMSMS management plan drafted. Technical data package requirements drafted.	DMSMS management plan updated. Technical data package that supports DMSMS mitigation strategy available.	Metrics and usage monitored as required.

LRL Quantified



- With benchmarks established, focused on quantifying effort required to achieve those benchmarks
 - Useful for project planning of available personnel and resources
- Evaluated percentage of total effort required at each phase
 - Considered each logistics element to have a 100% total effort by last phase
 - Simply stated each logistics element is fully supported by "Fleet Use"
- Percent effort is subjective number based on efforts outlined in the LRL for each element at each phase
- Graphed percentage effort as a function of phase of the project
- Example of one way to depict data

Percent Effort by Project Phase



LRL Tool



- LRL tool created in Microsoft Excel (compatible with Microsoft Office 2003) to evaluate a logistics readiness level
- Detailed evaluation requires familiarity with the project and tasks completed to date
- Buttons allow a point and click use of color
 - Grey indicates the project is not yet in that project phase therefore benchmarks are not applicable
 - Blue indicates the benchmark is not applicable due to the details of the project
 - Red indicates the benchmark task is not complete
 - Green indicates the benchmark task is complete

LRL Tool



- Numeric LRL score evaluated for each project phase
 - **LRL = 0 Unsupported** (zero% required tasks completed)
 - **LRL = 1 Poorly Supported** (1-50% of required tasks completed)
 - **LRL = 2 Moderately Supported** (50-70% of required tasks completed)
 - **LRL = 3 Nearly Supported** (70-90% of required tasks completed)
 - **LRL = 4 Fully Supported** (100% of required tasks completed)
- Numeric LRL scale provides a reference framework for project comparison

An LRL of 4 is the goal for all phases

LRL Prototypes



- Completed 4 prototypes on current Air Vehicle Projects
 - Identified gaps in logistics support (red areas)
 - Gaps reviewed with team leads and plan of action created
 - Plan to complete updated evaluation no later than six weeks
 - Monitor progress from initial evaluation and follow on evaluations
- Demonstration to follow in Microsoft Excel

LRL Benefits



- Benefits of LRLs include:
 - Template/benchmark to measure readiness by logistic element on a project level basis
 - Utilized to train/mentor new logisticians, engineering and program management personnel in sustainment requirements for tech insertion projects
 - Aid in planning manpower/funding/schedule requirements for projects as they mature from project concept to implementation
 - Dovetail with logistics risk assessments for another perspective
 - Offers a logistics readiness perspective for technology insertion currently missing from TRL evaluations

Value of LRL is the establishing the time phase benchmarks

Next Steps



- Continue to collect input on Draft LRL concept
 - Update/change draft as needed
- Establish a Joint working group to expand the scope to encompass a more joint perspective
- Complete four prototypes with follow up evaluations
- Initiate LRL evaluation for all Air 4.1D Air Vehicle Projects in FY 07



Questions?

AAIPT Points of Contact



- AAIPT Lead, Bob Ernst, 301-342-2203,
robert.ernst@navy.mil
- AAIPT Jacksonville Wiring, Andrew Yang, 904-594-5821,
andrew.yang@navy.mil
- AAIPT Assistant Program Manager for Logistics, Harry Proffitt, 301-757-0868, melvin.proffitt@navy.mil
- AAIPT Air Vehicle IPT lead, Don Sheehan, 301-342-9738,
donald.sheehan@navy.mil
- AAIPT Consultant, Elizabeth Broadus, 301-862-7049,
broadus_elizabeth@bah.com